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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/600,830

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Chin-I Lin

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07/17/2006

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EXAMINER

YANG, NELSON C

ART UNIT PAPER NUMBER

1641

DATE MAILED: 07/17/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/600,830

Applicant(s)

LIN ET AL.

Examiner

Nelson Yang

Art Unit

1641

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 17 May 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-34 is/are pending in the application.
- 4a) Of the above claim(s) 2-5, 10-13, 15 and 18-34 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1, 6-9, 14, 16 and 17 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☒ Claim(s) 1-34 are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Election/Restrictions***

1. Applicant's election without traverse of group I, claims 1-17 in the reply filed on May 17, 2006 is acknowledged.
2. Applicant's election without traverse of semiconductor nanoparticles (drawn to claims 6-8, 23-25) and trimethoxy silanes (drawn to claims 14, 16, 31, 33) in the reply filed on May 17, 2006 is acknowledged.
3. Claims 2-5, 10-13, 15, 18-34 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention or species, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on May 17, 2006.
4. Claims 1, 6-9, 14, 16, 17 are currently pending.

### ***Specification***

5. The disclosure is objected to because of the following informalities: in line 10 of page 3, applicant appears to have cited a patent number, US 572469, that does not correspond with the author cited.
6. Appropriate correction is required.

### ***Claim Rejections - 35 USC § 112***

7. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

8. Claims 1, 6-9, 14, 16, 17 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

9. With respect to claim 1, it is unclear how the template molecule is uniformly distributed as there is only one template molecule.

10. With respect to claim 1, it is unclear what the detection group of the matrix is. More specifically, it is unclear if the detection group is referring to the cavity with specific area (presumably created by the removal of the template molecule), or if it something separate from the cavity. If it is separate, it is unclear how the detection group was created. Further clarification would be appreciated.

11. Claims 1, 6 are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential steps, such omission amounting to a gap between the steps. See MPEP § 2172.01. The omitted steps are: the steps that would show how semiconductor nanoparticles would be polymerized, particularly since applicant has not disclosed any monomer or crosslinking agent that would allow for polymerization.

12. The remaining claims are indefinite due to their dependence on an indefinite claim.

### ***Claim Rejections - 35 USC § 102***

13. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

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(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

14. Claim 1 is rejected under 35 U.S.C. 102(a) as being anticipated by Spegel et al [Spegel et al, A new approach to capillary electrochromatography: Disposable molecularly imprinted nanoparticles, July 2002, American Laboratory, p. 29-30, 32-33].

With respect to claim 1, Spegel et al teach a method comprising mixing molecularly imprinted polymer nanoparticles with a template molecule, initiating polymerization, and then extracting the template molecule, leaving behind a cavity that is complementary to the template molecule in shape, size, and chemical functionality (p.30, col.1).

15. With respect to claim 17, Spegel et al teach that a radical initiator and cross-linking monomers are involved in the polymerization (p.30, col.1)

16. Claim 1 is rejected under 35 U.S.C. 102(b) as being anticipated by Perez et al [Perez et al, Molecularly imprinted nanoparticles prepared by core-shell emulsion polymerization, 2000, J App Poly Sc, 77, 1851-1859].

With respect to claim 1, Perez et al teach a method comprising template molecules added to seed particles between 30 and 45 nm and allowing polymerization to proceed (p. 1854, cols. 1-2). The template molecules are then removed, revealing imprinted core shell polymers (p. 1855, col.1, fig. 2).

17. With respect to claim 17, Perez et al teach the use of a compatible crosslinker and monomers such as styrene (p.1854, col.1) and initiators such as ammonium peroxodisulfate (p.1854, col.2) for polymerization.

*Claim Rejections - 35 USC § 103*

18. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

19. Claims 1, 6, 9, 14, 16 are rejected under 35 U.S.C. 103(a) as obvious over Vossmeier [US 6,458,327] in view of Perez et al [Perez et al, Molecularly imprinted nanoparticles prepared by core-shell emulsion polymerization, 2000, J App Poly Sc, 77, 1851-1859].

With respect to claim 1, Vossmeier teaches nanoparticle structures that define cavities tailored to the size of analyte to be detected (column 5, lines 20-40), where the nanoparticles structures comprised functionalized nanoparticles (plurality of nanoparticles) linked together by polyfunctionalized polymers (polymerization). Vossmeier fail to teach that the cavities are formed by molecularly imprinting with a template molecule that is subsequently removed.

Perez et al, however, teach that nanoparticle polymers prepared by molecular imprinting provide a means of creating specific recognition and catalytic sites similar to those found in biological systems (p.1851, col.1). Perez et al further emphasize that with smaller imprinted nanoparticles, one is able to exercise much better control over the particle size, and to narrow significantly the size distribution (p.1851, col.2). Perez et al teach that the molecular imprinting is accomplished by adding template molecules o seed particles between 30 and 45 nm and allowing polymerization to proceed (p. 1854, cols. 1-2). The template molecules are then removed, revealing imprinted core shell polymers (p. 1855, col.1, fig. 2).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to bind nanoparticles to a template molecule for molecular imprinting, followed by removing the template molecule, in order to create specific recognition and catalytic sites similar to those found in biological systems, while using nanoparticles that are able to provide exercise much better control over the particle size, and to narrow significantly the size distribution.

20. With respect to claim 6, Vossmeier teaches that the nanoparticles may be made of semiconductors (column 5, lines 45-50)

21. With respect to claim 9, Vossmeier teaches that the nanoparticles are functionalized (column 4, lines 51-65).

22. With respect to claim 14, 16, Vossmeier teaches that the nanoparticles may be functionalized by 3-aminopropyltriethoxysilane or by mercaptoalkylsilanes (column 4, lines 55-60).

23. Claims 7-8 are rejected under 35 U.S.C. 103(a) as obvious over Vossmeier [US 6,458,327] in view of Perez et al [Perez et al, Molecularly imprinted nanoparticles prepared by core-shell emulsion polymerization, 2000, J App Poly Sc, 77, 1851-1859], and further in view of Peng et al [Peng et al, Epitaxial growth of highly luminescent CdSe/CdS Core/Shell nanocrystals with photostability and electronic accessibility, 1997, J Am Chem Soc, 119, 7019-7029].

With respect to claim 7, 8, Vossmeier teaches semiconductor nanoparticles, as discussed above. Vossmeier does not specify that the semiconductor is a II-VI or III-V semiconductor, nor that the nanoparticles have a core-shell structure of at least two semiconductors.

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Peng et al, however, teach CdSe/CdS core/shell nanocrystals (p.7020, col.1). Peng et al further teach that the nanocrystals are extremely stable with respect to photooxidation, with electrons that are fully delocalized (p.7020, col.1), and electronic accessibility (p. 7029, col.2).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention for the semiconductor nanoparticles of Vossmeier to be CdSe/CdS core/shell nanocrystals, as suggested by Peng et al, in order to obtain nanoparticles that are extremely stable with respect to photooxidation, with electrons that are fully delocalized and electronic accessibility.

### *Conclusion*

24. No claims are allowed.

25. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nelson Yang whose telephone number is (571) 272-0826. The examiner can normally be reached on 8:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Long V. Le can be reached on (571)272-0823. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.



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26. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Nelson Yang  
Patent Examiner  
Art Unit 1641

  
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